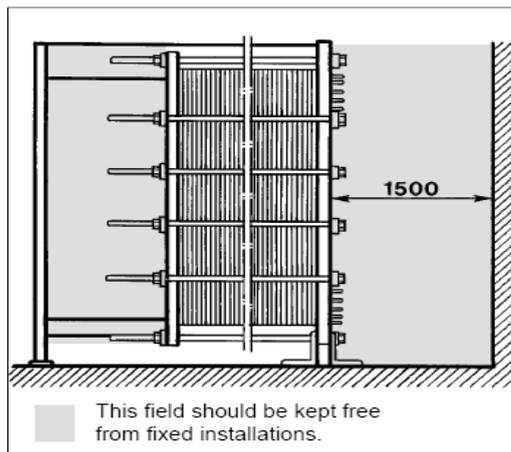
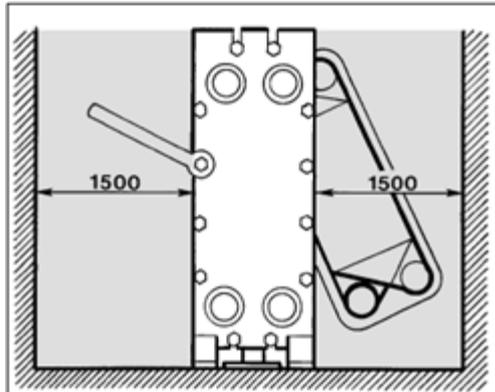




BAODE GASKET

Installation

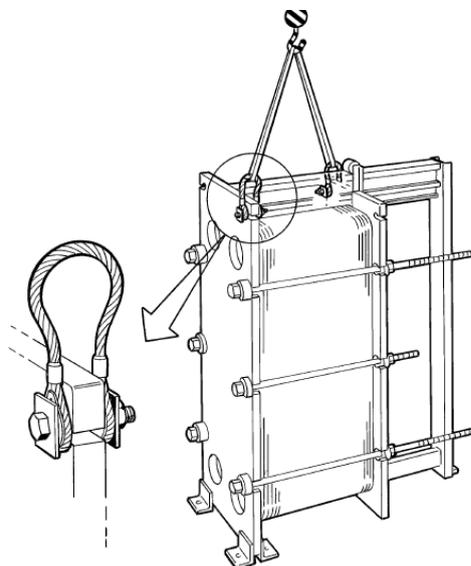


Before connecting any pipe to the heat exchanger, make sure all foreign projects have been rinsed out of the system.

As will appear from the dimension drawing provided by BAODE, and from the picture above, it is necessary to leave free space around the apparatus, to give access and make future service possible. Except for a place to put the plates, if removed from the heat exchanger, no further space is required for servicing the apparatus.

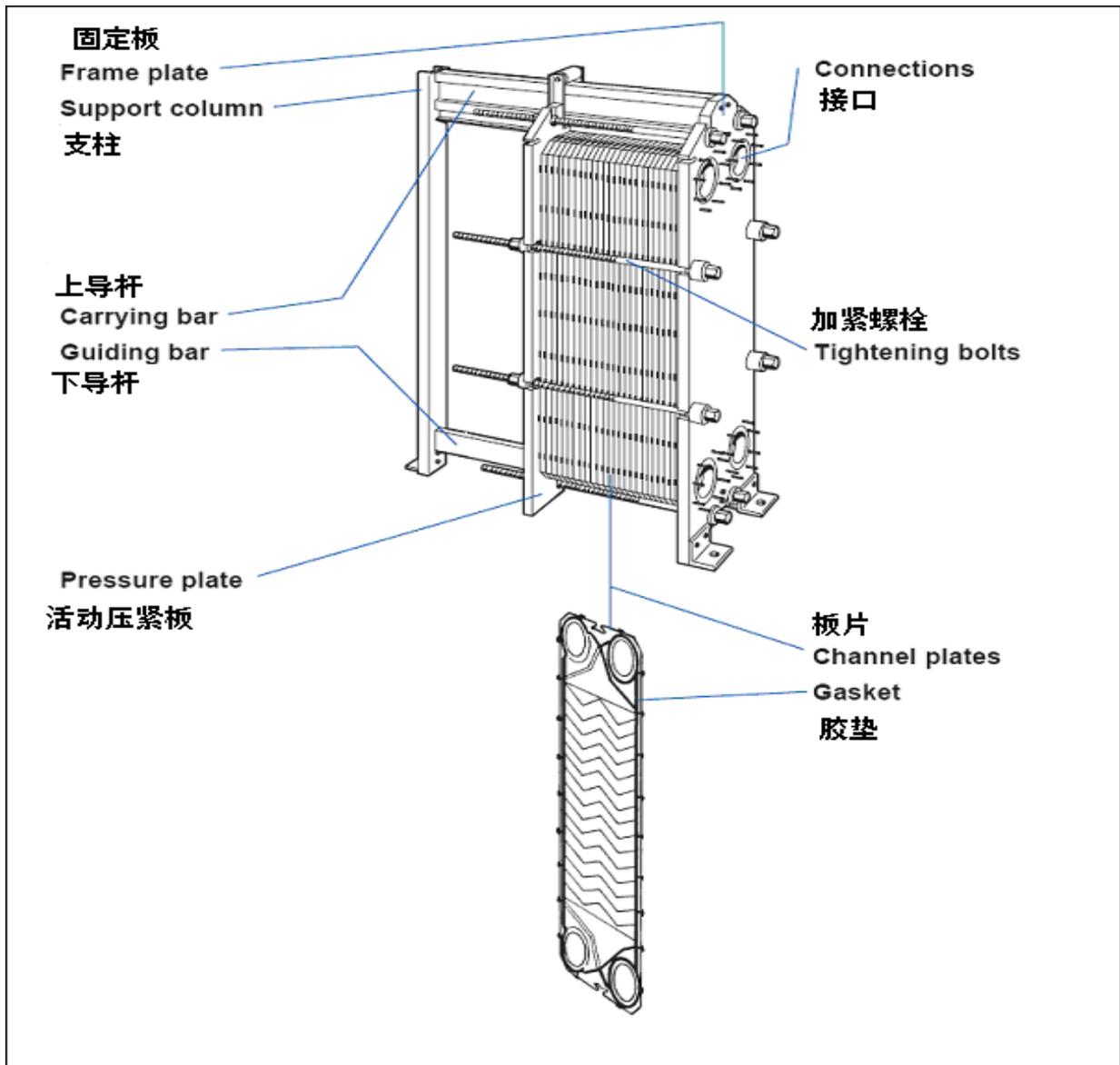
The measurements given in the picture are recommended by BAODE, to provide reasonably good working conditions, during installation of the heat exchanger as well as for future maintenance and service. If floor space is restricted then the dimensions suggested can be reduced, and it is left to the purchaser to decide just how much access space can be left.

If you are to lift the heat exchanger itself, straps should be used. They should be placed as shown on the picture



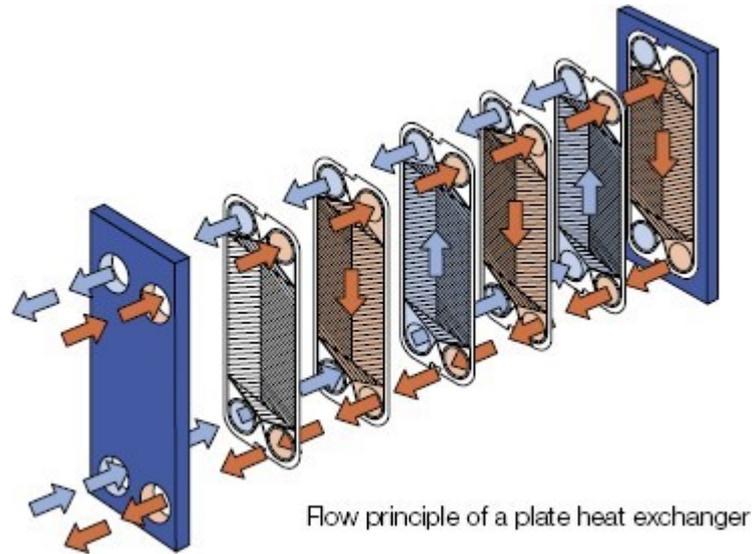
WARNING! Never lift by the connections or the studs around them. 

1. Construction



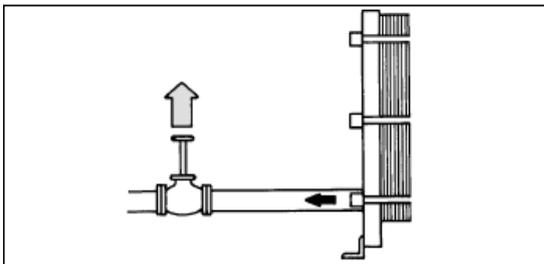
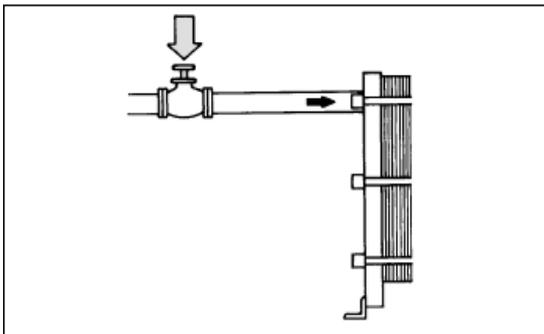
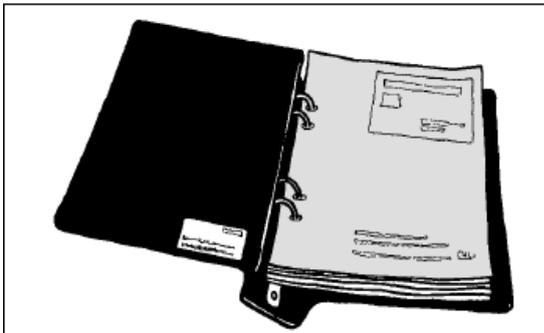
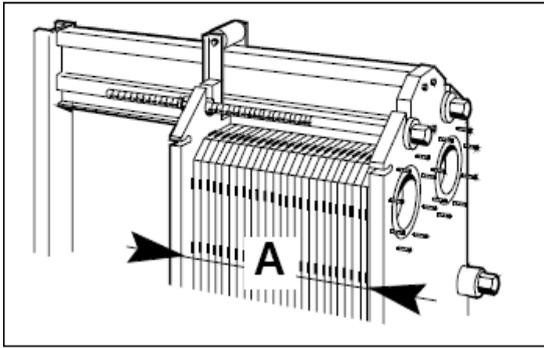
The plate pack is assembled between a fix frame plate and a movable pressure plate and compressed by tightening bolts. The plates are fitted with a gasket which seals the inter plate channel and directs the fluids into alternate channels. The frame plate and the pressure plate are suspended from an upper carrying bar and located by a lower guiding bar, both of which are fixed to a support column. Connections are located in the frame plate or, if either or both fluids make more than a single pass within the unit, in the frame and pressure plates.

Work principle:



Channels are formed between the plates and the corner ports are arranged so that the two media flow through alternate channels. The heat is transferred through the plate between the channels, and complete counter-current flow is created for highest possible efficiency. The corrugation of the plates provides the passage between the plates, supports each plate against the adjacent one and enhances the turbulence, resulting in efficient heat transfer

Starting up



1. Before starting up for the first time or after a long time of close-down: Make sure that the plate pack is compressed to the right measurement A. Check with the Data-Print, which is located in the inside pocket of the back cover. It is very important that the system to which the heat exchanger is connected, is protected against sudden and extreme variations of temperature and pressure to avoid damages. This applies not only for the heat exchanger but also for the pipe system itself and every piece of equipment included in it.

This should be kept in mind whenever a maneuver is to be carried out, including starting up of the pumps in the system.

Before starting any pump, check whether instructions exist, telling you which pump should be started first.

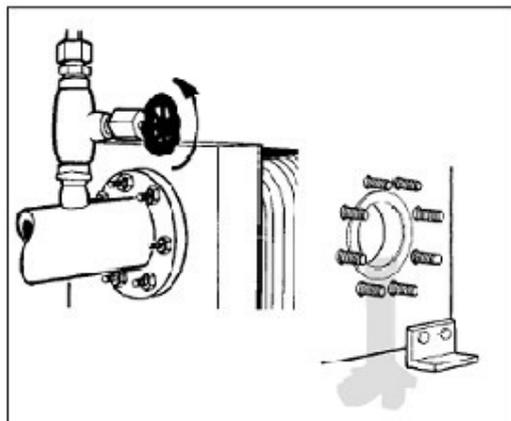
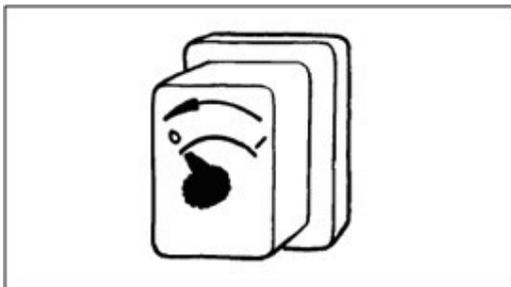
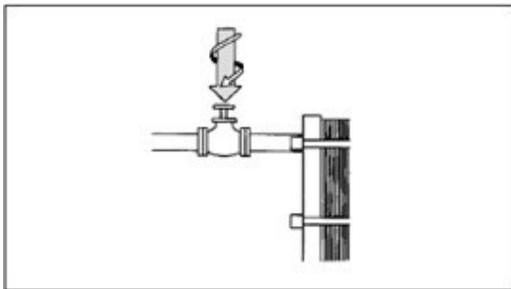
2. Check that the valve between the pump and the apparatus, controlling the flow rate of the system which you are about to start up is closed.
3. Check that the valve at the exit – if there is one – is fully open.
4. Open the vent.
5. Start the pump.
6. Open the valve slowly.
7. When all air is out, close the vent.
8. Repeat the procedure for the other media.

Unit in operation

Any adjustment of the flow rates required to maintain correct temperatures or pressure drops should be made slowly, in order to prevent shocks to the system. Problems in keeping up the performance of the heat exchanger may be caused by a change of some of the temperature conditions, the heat load or by fouling. As long as the apparatus is operating to satisfaction, it should be left without any interference.

Shut-down

If the heat exchanger is going to be shut down – Or if for any reason at all the pumps are to be stopped – the following procedure should be followed:



1. First establish whether instructions exist as to which side should be stopped first.

2. Slowly close the valve controlling the flow rate of the pump you are about to stop.

3. When the valve is closed, stop the pump.

4. Repeat the procedure for the other side.

5. If for any reason the heat exchanger is shut down for a longer period (more than a number of days), it should be drained, and depending on the media processed, it is recommendable to rinse and dry it.

The risks of not complying with the start-up and shut-down procedures

A liquid in motion in a pipe system represents a lot of energy, and it must be very carefully dealt with. Particularly when the fluid is stopped it is imperative that this is done smoothly. Valves must be operated gradually. The longer the pipes and the higher the flow rate, the more important this becomes.

NOTE!

For this reason, fast-closing valves should not be used unless the pipes of the system are very short.

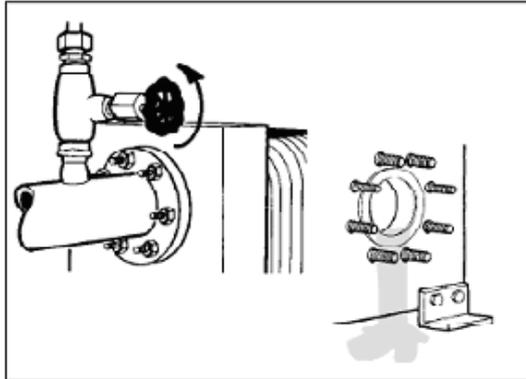
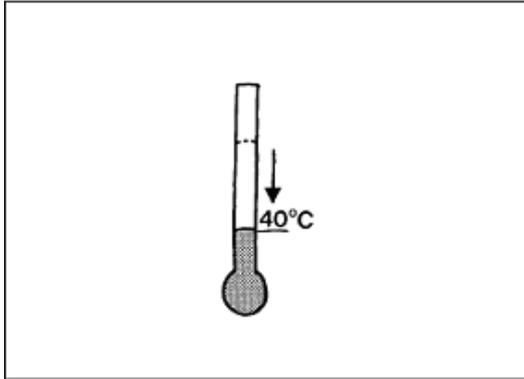
WATER HAMMER is the name given to a short-lasting pressure peak, travelling along the pipe as a wave at the speed of sound, and resulting from a sudden deceleration of the motion of the fluid in a closed system.

Thus, it is usually related to the shutting down of a system. However, when starting up a system with open valves and empty pipes, the fluid may burst into some obstacle, like a fine-mesh strainer, a flow meter or a heat exchanger, causing a sudden reduction of the flow velocity – if not a complete halt –, and so we may have the conditions of a Water Hammer. In the worst case, the pressure surge caused by such a sudden stop of the motion of a fluid can be several times the normal pressure of the system.

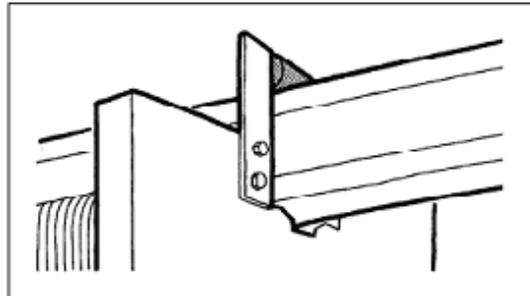
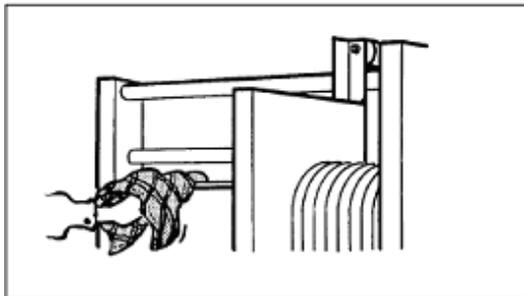
Therefore, it is important for the protection of the whole installation that start-ups and close-downs are carried out with great care

Open and Assembly

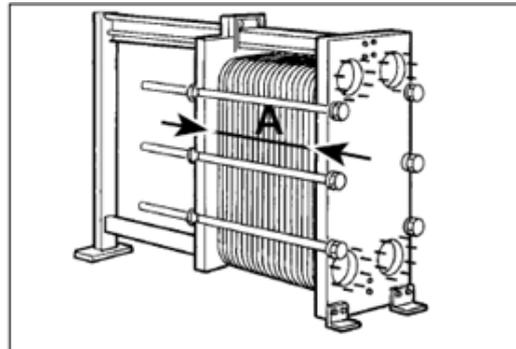
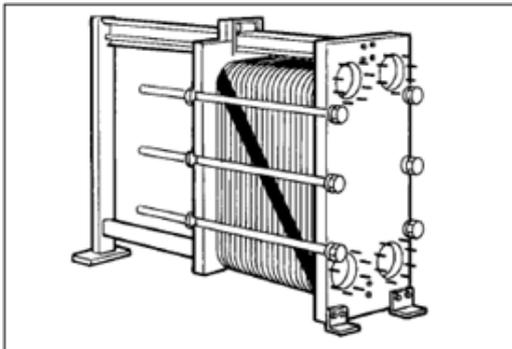
Open:



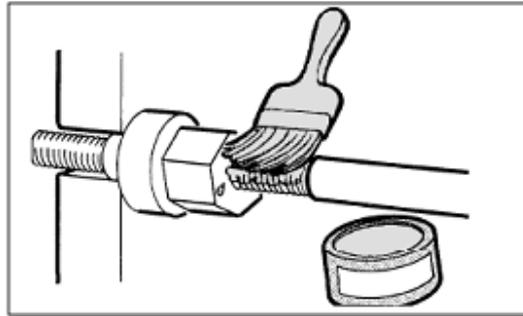
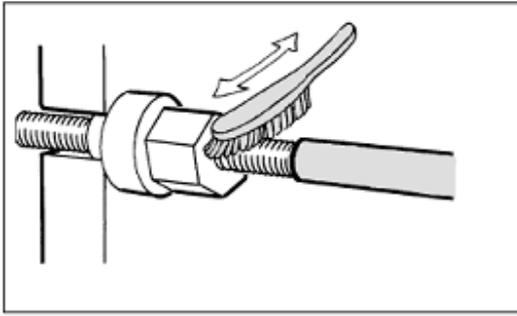
1. If the heat exchanger is hot, wait until it has cooled down to about 40°C and drain.



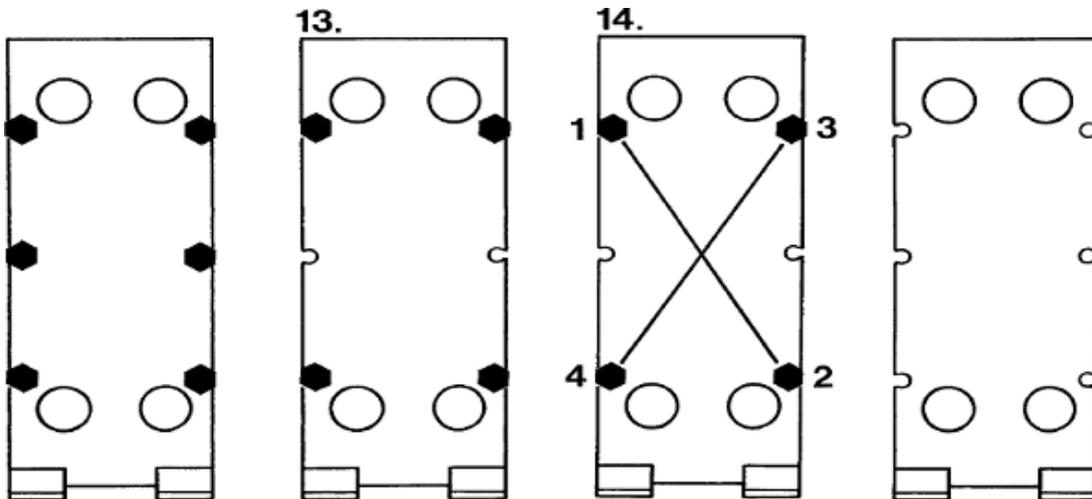
2. Inspect the sliding surfaces of the carrying bar and wipe clean.



3. A. Mark the plate assembly on the outside by a diagonal line, or number the plates in sequence, Measure and note down the dimension A.



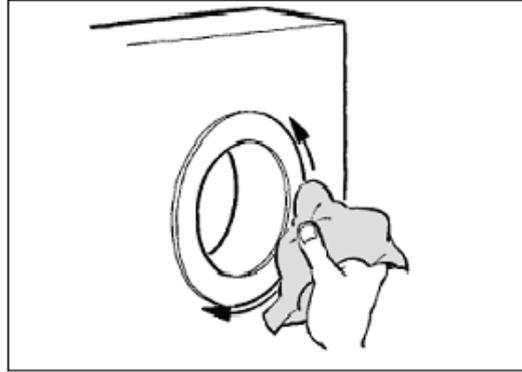
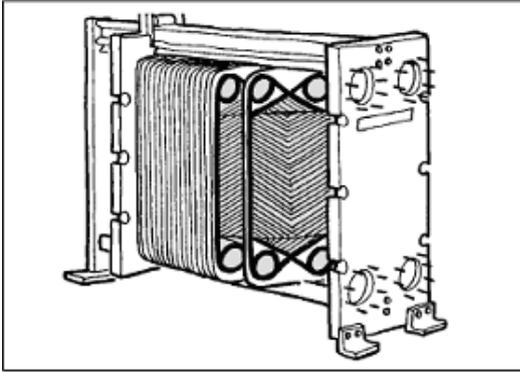
4. Pull back the plastic covers on the tightening bolts; brush the threads clean with a steel wire brush. Lubricate the threads with a thin layer of grease, e.g. Gleitmo 800 or equivalent.



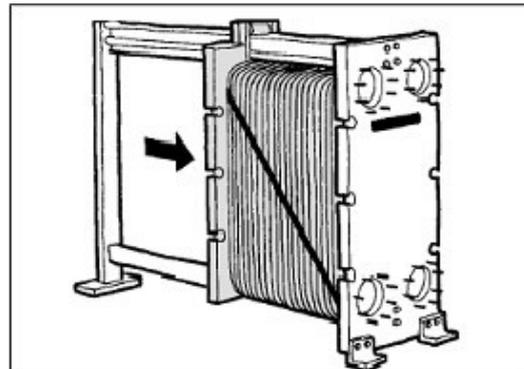
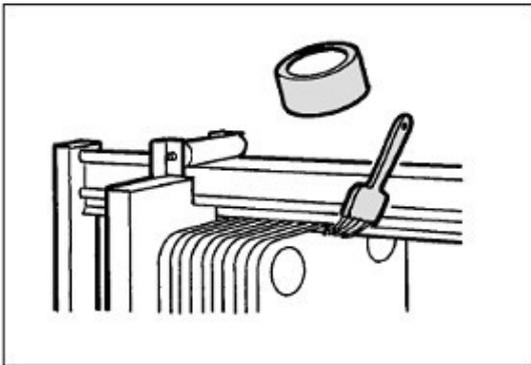
Order	Bolt No.	To dimension
1	1-2-3-4	1.05 A
2	1-2 or 3-4	Opening

5. Please follow the 1-2-3-4 or 1-2,3-4 to loose the bolts.

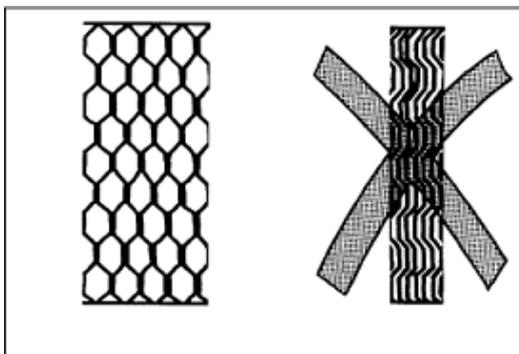
Assembly and Closing



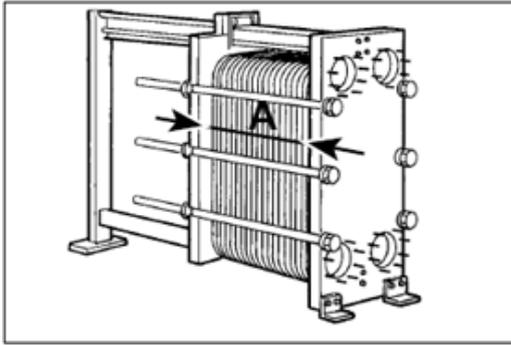
1. Check that all the sealing surfaces (i.e. surfaces in contact with the heat transfer medium) are clean. Check that the ring gaskets, when fitted in connections, are in position and are in good condition.



2. Clean and lubricate the sliding surfaces of the carrying bar.
3. Press the plate assembly together

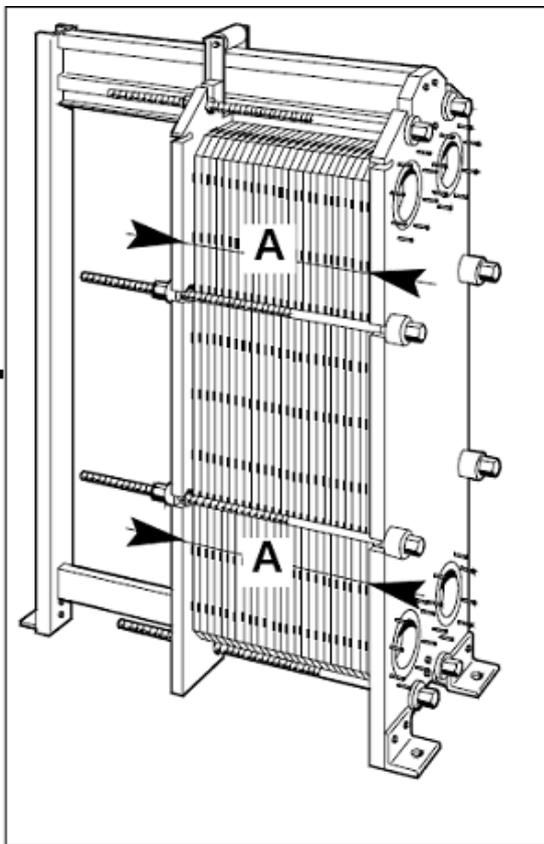


4. If the plates are correctly assembled; the edges form a "honeycomb" pattern. If the plate pack has been marked on the outside (fig.6) check this.



A. When tightening the plates packing, please follow the same procedure of open. And check the dimension A, the actual dimension cannot be less than A.

A length.



The length of A calculate as below:

$$A = NX,$$

The length of the plates packing cannot exceed following:

Length of the per plate	Plates packing length
>4mm	A+1%
>3mm, <4mm	A+1.5%
<3mm	A+2%

Maintenance and Clean

Baode suggest you maintain the heat exchanger and clean it when need. The maintenance period depends on the fluids Chemical Properties and the thermal load.

1.Regular Maintenance

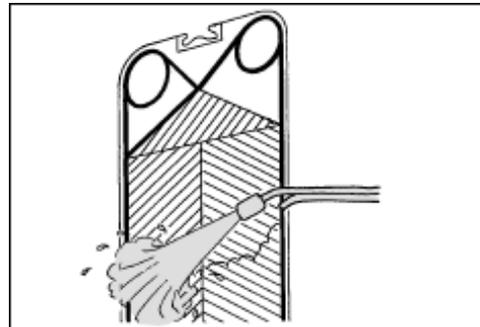
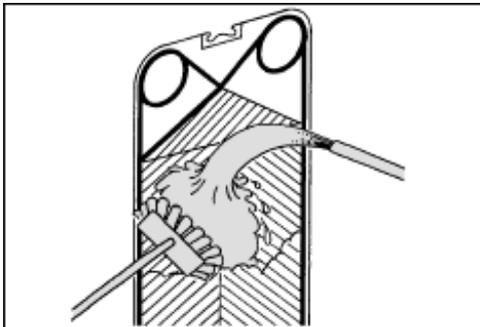
The regular maintenance no need to open the heat exchanger. The method is use certain weak acid to flush in reverse

2.Special Maintenance

When do special maintenance, use certain liquid clean the plates as following steps, the volume of the liquid depends on the deposition condition.

1. Open the heat exchanger.
2. Remove the plates from the Heat Exchanger.
3. Clean the plates by the soft brush with the stream.
4. Flush by the pressure water.

Note: Under no circumstances should hydrochloric acid be used with **Stainless steel plates**. Water of more than 300 ppm Cl may not be used for the preparation of cleaning solutions. It is important that carrying bars and support columns in aluminum are protected against chemicals.



Cleaning

Biological growth – slime

- Bacteria
- Nematodes
- Protozoa

Chemical cleaning using alkaline cleaning

Agents:

- Sodium hydroxide
- Sodium carbonate
- Cleaning effect can be considerably increased by the addition of small quantities of hypochlorite or agents for the formation of complexes and surfactants.

*Concentration max 4%. Temperature max 80°C.

Incrustation – scaling

- Calcium carbonate
- Calcium sulphate
- Silicates

Chemical cleaning on opened unit by using:

- Nitric acid
- Sulfamic acid
- Citric acid
- Phosphoric acid
- Complexing agents (EDTA, NTA)
- Sodium polyphosphates

*Concentration max 4%. Temperature max 60°C.

Cleaning

Sediment

- Corrosion products
- Metal oxides
- Silt
- Alumina
- Diatomic organisms and their excrement of various colors

Chemical cleaning on opened unit by using:

- Nitric acid
- Sulfamic acid
- Citric acid
- Phosphoric acid
- Complexing agents (EDTA, NTA)
- Sodium polyphosphates

*Concentration max 4%. Temperature Max 60°C.

Oil residues, asphalt and fats

- Oil residues
- Asphalt
- Fats

Hydrocarbon-based deposits may be removed by using a soft brush and a PARAFFINIC or NAPHTHA-BASED solvent (e.g. Kerosine).

NOTE!

Gaskets in natural, butyl and EPDM rubber swell in these media.

Contact time should be limited to 0.5 hour. The following solvents should not be used:

- Ketones (e.g. Acetone, Methyl ethyl ketone, Methyl isobutyl ketone)
- Esters (e.g. Ethyl acetate, Butyl acetate)
- Halogenated hydrocarbons (e.g. Chloroethene, Carbon tetrachloride, Freons)
- Aromatics (e.g. Benzene, Toluene)